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Soil and Water CONSERVATION in Many Countries

MISCELLANEOUS
PUBLICATION 908

SOIL CONSERVATION
SERVICE

U.S. DEPARTMENT
OF AGRICULTURE

The affairs of the soil may not have the strange magnificence of the outer universe or the curiosity of the inner recesses of the atom; but they touch our daily life more intimately.

—*Gilbert Wooding Robinson*

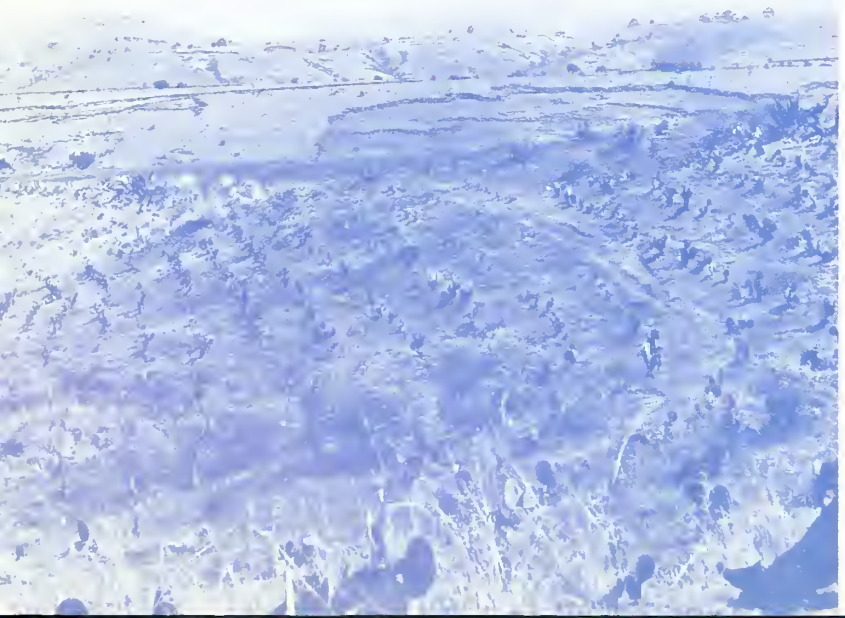
Cover picture: In Taiwan, bench terracing is the most common practice for erosion control and for increasing crop production. They report, "Each year we have 45 to 48 technicians receiving soil conservation training. In the last 7 years 450 have been trained. The training induces the technicians to serve actively in their communities."

THIS PICTURE BOOK is intended to tell in a small measure the story of soil and water conservation around the world.

The pictures come from many countries. Better than words they reflect the richly rewarding quarter of a century just ended—the quarter century of the development and spread of modern conservation as the good way of using land.

In the vast Hunter Valley of Australia, contour furrowing aids in reclaiming sheet-eroded undulating grazing land. It is a favorite practice in most parts of the continent where grass is so important and soil moisture so necessary to grow the grass. Egyptian farmers (right) crowd through a narrow passageway to study an exhibit showing conservation treatment of land around a detention reservoir designed to control flooding and to store water for crops.

Pictures made more than 20 years ago show first steps in applying soil conservation: Level terracing in Brazil. Right, check dams for gully control in Thessaly, Greece. Bottom, left, contour planting of near desert vegetation in Mexico—a desperate attempt to restore badly eroded cropland. Bottom, right, the first contour plowing in a rich Venezuela valley.



Two versions of contour planting used widely in Mexico today: Alfalfa grown in level strips and with graded seep ditches—a type of contouring seen in the Valsequillo soil and water conservation district. Contour-cultivated maize (bottom) on sloping land, with vetch interplanted for protection against erosion, for holding moisture in the soil, and for soil conditioning.

An aerial view of a well-planned conservation farm in Southern Rhodesia. Splendid work under the well-established soil and water conservation programs of the Rhodesia-Nyasaland Federation is generating optimism regarding the parts of Africa not yet reduced to near-desert or desert. All land being put to use, whether newly broken out from the wild or long abandoned is being planned for permanent usefulness and productivity with conservation of soil and water resources the basic principle for planning.

Halting desert creep in India requires thousands of small and large projects. Mulching and planting the sand dunes is the beginning step in stabilization.

Eroded and abandoned land in Bihar undergoes complete re-forming and rejuvenation as heavy equipment is made available under India's soil conservation program. A group of farmers study the new face of the land.

This now famous picture of a bunding project in Bombay Province was posed nearly 20 years ago when Indian conservationists vowed they would prove that large-scale soil and water conservation works could be built without heavy equipment.

This farmer of India has reason for pride of accomplishment—his dry blow-land revegetated.

Progress in Bombay, India: A large bunding project completed and performing with precision its three-fold job—prevention of soil damage, conservation of water, and increase in yield of all crops.

Water spreading in Southern Negev, Israel, near Sedeh-Boker, where average rainfall is 4 inches. Bottom, in Israel overlooking Lake Tiberias, terraces bolster the contours on this sloping field of gladiola grown for the flower market.

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Each Australian state has its own soil conservation program, modern and energetically carried out. Three officers of the Soil Conservation Authority of Victoria examine lucerne residue after grazing. Residue is needed to protect both lucerne crowns and soil during long dry periods. The close examination is being made because the farm was entered in a soil conservation competition. In one district, 79 farmers entered and 500 attended the field-day ceremony and tour. The winner (left) receives the silver cup, which he may hold for 1 year. A trophy is donated by the Authority as a permanent reminder of his success as a conservation farmer.

Before-and-after pictures are nowhere more convincing than on the land: This grazing land in the Southwest Slopes region of New South Wales, Australia, shows severe gully erosion. Bottom, left, the same land after grass waterways, contouring, and small storage dams were installed to cure the gullying. A technician of the New South Wales Soil Conservation Service is examining the vegetation of the waterway. Bottom, right, a close-up of one of the small dams and its reservoir.

In Italy—Monti Fiore, Ascoli, Picero—every square foot of land is protected from erosion and used to produce food crops. Near Mengo, Uganda (bottom), a large crew of conservation workers construct water-holding terraces by hand to preserve valuable hill soils from erosion.

Soil conservationists of North Island, New Zealand, face a land-slip problem. The Lombardy poplars have been space planted on the steep face of the Tetiaru mudstone hill with a slope of 28 to 32 degrees. The rooting system of these trees assists greatly in holding land prone to slipping.

In Poland, contour stripcropping with vegetative barriers and tree groves at the crown protects a steep slope needed for cultivated crops.

Reforestation of stony foothills in Guarico, Venezuela, requires hand watering to help young trees in getting a foothold.

A unique runoff diversion especially devised for the steep Andes in Venezuela. It is successful in preventing further accelerated erosion and also in carrying runoff to lower land where it is needed.

Most of the new coffee plantations being installed in São Paulo, Brazil, follow the modern technique of contour planting—result of vigorously conducted educational campaigns by the state's Division of Soil Conservation.

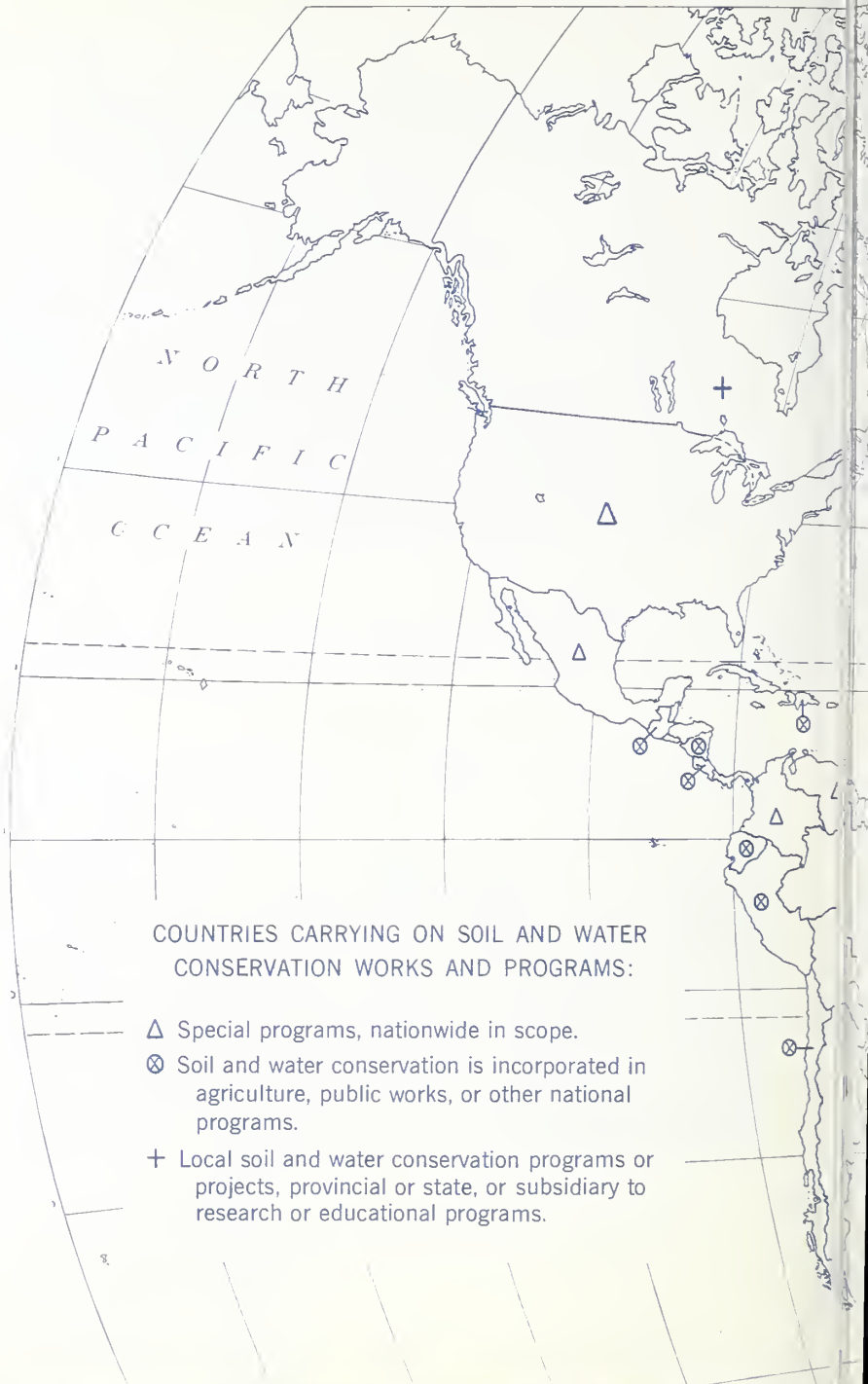
Conservation planting of coffee in Colombia. Each coffee tree has its own small terrace. This keeps the soil from washing away.

Top, in the Philippine Republic, a farm pond—beloved of little children—is part of a conservation farm plan. Testing supplemental irrigation (bottom) before planning for cropping and erosion-control practices.

A conservation technician of the Bureau of Soils, Manila, examining the understory of kudzu, planted to control gullying. Bottom, contour plowing of tropical soils in the Philippines.

Today people talk about soil conservation in many languages, for the relatively new science is spreading throughout the world. Already it is benefiting large numbers of people, communities, and even nations. With reasonable accuracy we now can estimate that a billion acres of the world's agricultural land has been treated in some degree for soil and water conservation in the last quarter century.

The map shows countries of the world that now have organized programs for carrying out soil and water conservation work on a long-time basis. Some are still handicapped because of lack of trained conservation scientists and technicians. There is no apparent inclination, however, to abandon any of the projects or objectives.


NORTH
PACIFIC
OCEAN
COUNTRIES CARRYING ON SOIL AND WATER CONSERVATION WORKS AND PROGRAMS:
Δ Special programs, nationwide in scope.
⊗ Soil and water conservation is incorporated in agriculture, public works, or other national programs.
+ Local soil and water conservation programs or projects, provincial or state, or subsidiary to research or educational programs.

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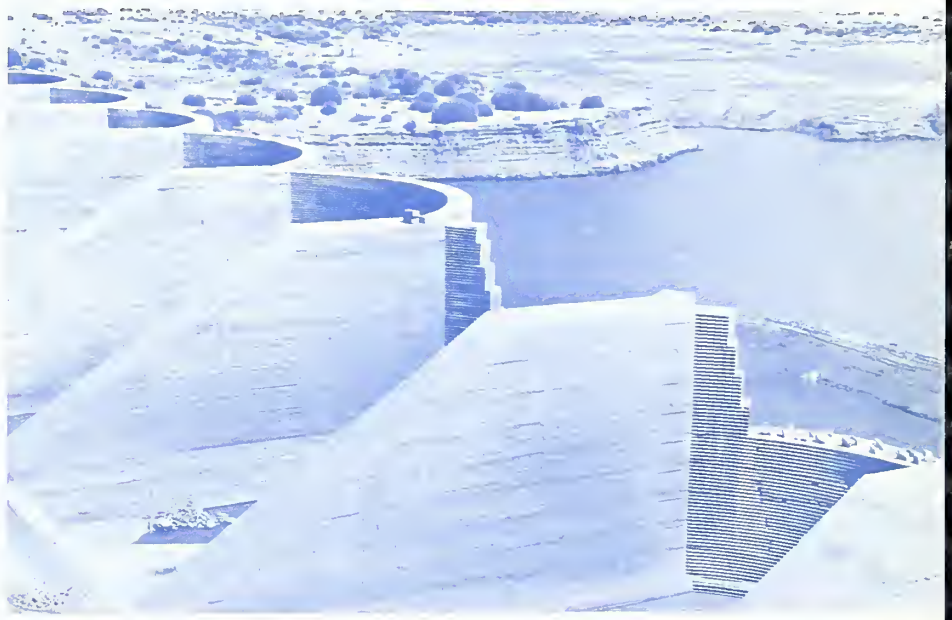
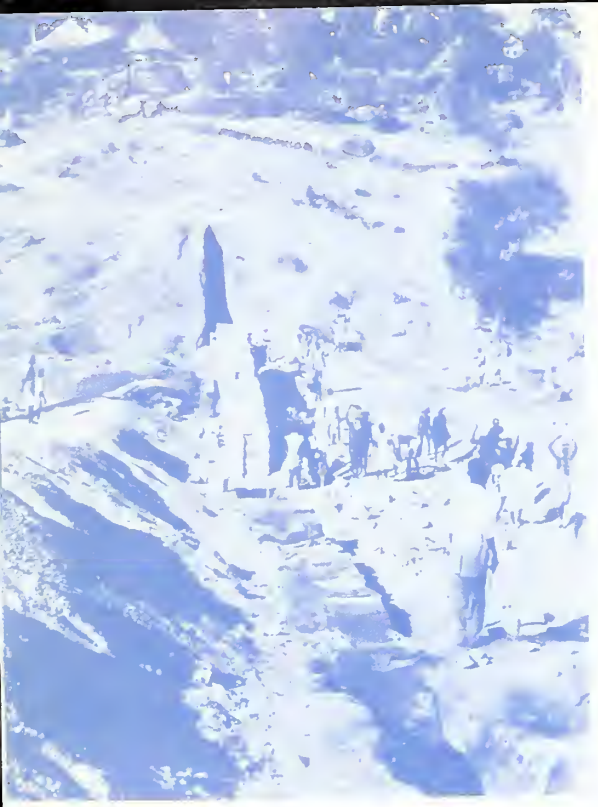
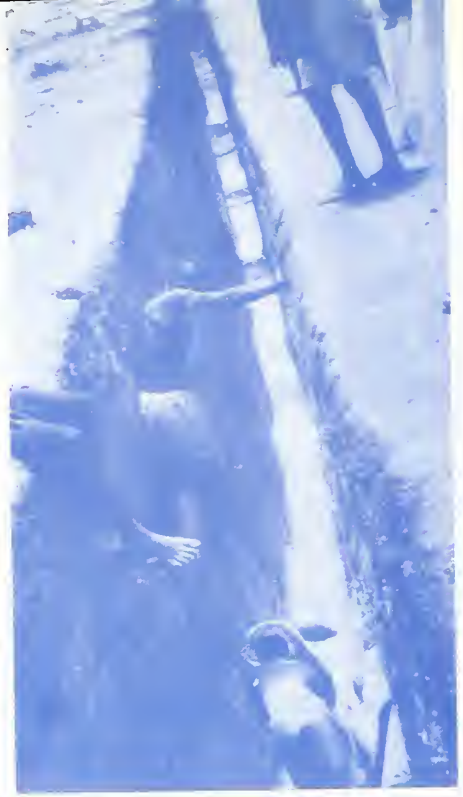
A debris dam in the Te Weraroa Stream, North Island, New Zealand, made by driving willow stakes into the streambed and lacing them with wire netting. This is a simple and inexpensive structure and effective in the area.
Strong-rooted grasses are used here to stabilize a steep slope subject to soil-slide.
Restored landscape of great beauty (bottom) in South Island, New Zealand. All the land in the foreground was gullied and ugly. Leveling and planting the gullies, regrassing, fencing, and harnessing the runoff solved the problem.



There is need for water conservation in Africa: In the North Transvaal, Republic of South Africa, this is the only domestic water supply for these people. Top, right, in the Cape Province, this is one of the many schemes being carried out to reclaim both water and soil. Bottom, a fine example of combined water and soil conservation near Bellville, Cape Province—a graded and banked grass waterway serving a large acreage, protecting both terraced slopes and bottom lands.



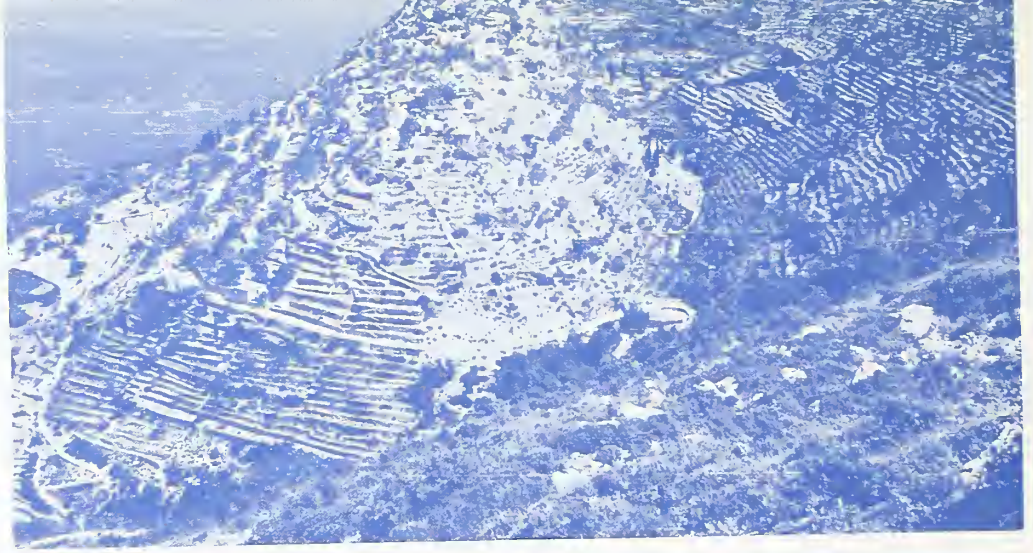


In the Sudan, construction of a core wall for water storage as a part of a community soil conservation plan. Center, close-up view of the trench for the core wall. Top, right, another view of the core wall with contouring of the site for soil protection.

An irrigation ditch through a modern oasis in Algeria, north edge of the Sahara Desert—good soil treatment, efficient use of water, excellent yields.

Boy Scouts of the Ganaraska River Conservation Authority, Ontario, Canada, work skillfully at tree planting on the 7,000-acre forest. They are helping to speed complete conservation on their watershed.

In Northern Greece (Kastoria) men, women, and children turn out to plant trees on steep, eroding land. Bottom, modern contour farming helps increase yields by saving soil moisture for crops and by preventing erosion on the Island of Euboea, Greece.



On another Isle of Greece are famous stone-bench terraces topping a promontory where immense amounts of vegetables and other food crops are grown to supply city markets. Bottom, a close view of stone bench terraces on the Island of Naxos.

In Thessaloniki, Greece, the people brave chill and mud to learn about a soil conservation plan firsthand by walking over the land. Their guide and teacher is a planning technician of Greece's Soil and Water Conservation Service. Top, right, Father Kyprianos of Stavrovouni Monastery, Cyprus, stands at his irrigated terraces which he helped design. He labored untiringly to promote the practice throughout his country as basic to the now famous soil conservation system of the Mediterranean Island. Many students and conservation technicians visit Cyprus each year to study conservation practices applicable to the region. Bottom, left, Greek high school students measure runoff and sediment. Some may become conservation technicians to help with their country's nationwide soil and water conservation program. Bottom, right, a broad view of the Cyprus stone terraces on a 20- to 30-percent slope. Vineyards have been established on most of the terraces.

Learning while young. Two best ways:
In the field, with the soil conservationists as guides and teachers. This picture is in Missouri, U.S.A. Left, the exhibit way, indoors or outdoors, along the city street, at the fair, in the school, wherever there is space to erect a simple display. This is at the Royal Agricultural Show in Victoria, Australia. The Soil Conservation Authority provides similar displays for all county towns.

The "Father of Soil Conservation," Dr. Hugh Bennett, with farmer friends in Italy only a few years before his death. Invited to visit Italy to suggest improvements in the country's soil conservation program, he tramped over many farms and upon return to the United States made the remark that Italian farmers use every square foot of their land to grow food for themselves and feed for their livestock and make the finest haystacks he had found anywhere.

A conservation farm
in the United States of America.
All soil and water conservation needs
were incorporated in the plan
that was applied on this farm.

The trend toward conservation of whole watersheds is spreading in the United States. This picture shows the type of water management structure that was found necessary, as well as some of the soil conservation practices of the complete watershed plan.

Grass is the most important factor in many soil conservation programs. This is especially true in most parts of Africa. The pictures on this page give a hint of the painstaking labor required to get grass where it is most needed: Left, experimentation to improve and adapt grass to soil and climatic conditions. Top, establishing a stand of grasses to suit livestock populations in South Africa. Bottom, left, improvement of native grazing land such as this range in Sudan where rainfall is 20 inches and of tree and shrub growth of the type of acacias that need constant care to prevent spreading. Bottom, right, grass seed is more precious than gems. Hand winnowing and packing of seed of improved and tested grasses occupy many Africans.

A Guatemala Indian's farm near Quiche shows a crude contour cultivation characteristic of a large area in that part of Central America. The contour ridges shown are planted to maize. This apparently is an ancient practice used by the Indian farmers through the centuries in an attempt to preserve their hill soils. Bottom, a surprise comes when the student of conservation learns that enormous amounts of the world's vegetables are grown on mountain terraces as in Costa Rica where the people like to live in the highlands. These step terraces are of slight gradient so that rainfall is well distributed and no soil is washed off the slope.

Research will always be an essential part of our soil and water conservation programs: Grass trials being carried out on Wither Hills Soil Conservation and Rivers Control Council Reserve, Marlborough, South Island, New Zealand. Left, research on runoff and erosion under designed storm (by rain simulator) in furrows of different grades, Soil Conservation Research Station, Israel.

Justice William O. Douglas,
Supreme Court of the
United States of America,
said that the soul of a people
invariably makes an indelible
imprint upon their land.

Prepared by Phoebe O'N. Harrison, *Soil Conservation Service*

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Growth Through Agricultural Progress